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19 September 2019

VIA ELECTRONIC FILING

Marlene H. Dortch, Secretary  
Federal Communications Commission  
445 12th Street, S.W., Room TW-B204  
Washington, DC 20554

**Re: Rural Digital Opportunity Fund, WC Docket Nos. 19-126 and 10-90**

Madam Secretary:

We deeply appreciate the FCC's continued focus on closing the digital divide.

In the attached brief, we provide our recommendations for improving the success of the Rural Digital Opportunity Fund in the rural and rugged areas of southern and eastern Ohio, a region of 17,000 square miles and 700,000 households. Our findings and suggestions would likely apply broadly across the entire 13-state Appalachian region due to commonalities of terrain, population density and low household income.

Despite negative stereotypes prevalent regarding Appalachia, our service area enjoys the benefits of a strong work ethic, ingenuity, resourcefulness and dedication to communities. The absence of reliable, high-capacity broadband, though, presents a deficit we cannot overcome, impacting the full spectrum of life from school children and working-age adults to the elderly.

In addition to providing the attached brief, we extend an offer for a guided tour in our region to gain first hand understanding of the challenges we face.

Sincerely,

Misty Crosby  
Executive Director

Tom Reid  
Broadband Consultant

Attachment: **Comments on the NPRM for the Rural Digital Opportunity Fund, WC Docket Nos. 19-126 and 10-90**



## Connecting Appalachia – Resolving the Last Mile Puzzle

### A. Introduction

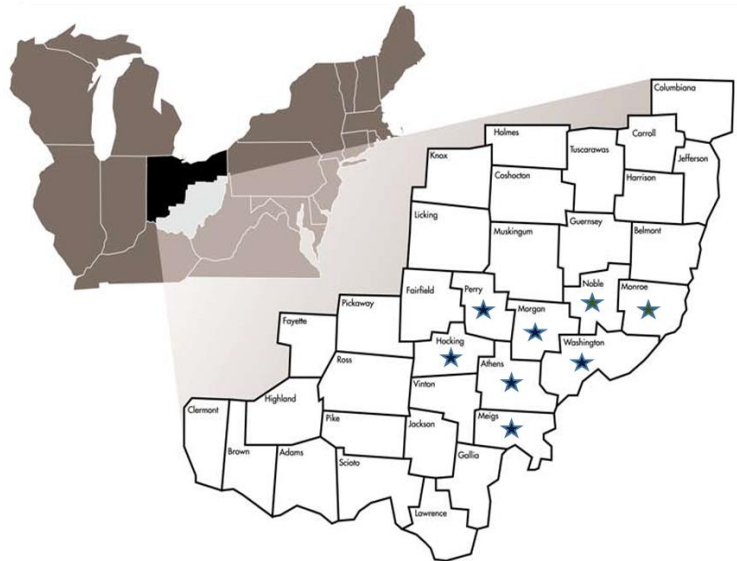
The Connecting Appalachia consortium advocates for 34 counties in southern and eastern Ohio as depicted in Figure 1. For over a decade we have focused on expanding broadband across the 17,000 square miles to support the economic, educational and cultural well-being of the region.

Our successes include \$130 million in middle-mile investments funded with \$16 million from the FCC Rural Health Care Pilot Program, \$66 million from the NTIA Broadband Technology Opportunity Program and \$48 million in private match.

Our goal, though, of bringing broadband to 100% of the 700,000 households in the region remains elusive. The Buckeye Hills Regional Council (BHRC), a founding member of the Connecting Appalachia consortium, is currently conducting an eight-county study funded by the Appalachian Regional Commission (ARC) POWER Initiative. The study focuses on the current state of broadband availability and analyzes methods to close the digital divide in our region. Our interim findings highlight the urgent need for the FCC to prioritize funding for Appalachian Ohio for the following reasons.

- The digital desert persists as explained in Section B of this document:
  - De minimis deployments by price cap carriers receiving CAF II funding in our study area have left large swaths of our region unserved; and
  - The incumbent's copper infrastructure has been allowed to degrade in place diminishing the reach, performance and reliability of broadband services.
- Fixed-wireless options do not offer a solution for 100% coverage in Appalachia due to the combination of terrain and foliage cover as explained in Section C of this document.
- Fiber-to-the-premise will provide the optimal solution but requires high capital subsidies and will involve long ramp-up of revenues as explained in Section C of this document.
- The lack of response from carriers to Auction 903 in our region as described in Section D of this document demonstrates the need to increase reserve pricing.

Despite negative stereotypes prevalent regarding Appalachia, our region enjoys the benefits of a strong work ethic, ingenuity, resourcefulness and dedication to communities. The absence of reliable, high-capacity broadband, though, presents a deficit we cannot overcome, impacting the full spectrum of life from school children and working-age adults to the elderly.



*Figure 1: Connecting Appalachia service area with ARC-funded study area counties "starred"*

For these reasons we ask the FCC to prioritize the pressing needs of Appalachian Ohio through the following adjustments to Rural Digital Opportunity Fund (RDOF).

1. Strongly favor the gigabit tier in the weighting and eliminate high latency services as explained in Section E of this document.
2. Lower the subscription milestone to 40%, recognizing the impact of low household income and competition from less-capable services as explained in Section H of this document.
3. Lower the projected monthly average revenue per user to \$50.00, recognizing the impact of low household income and fragmentation of the market for voice and streaming services as explained in Section J of this document.

We also encourage a 10% increase in reserve pricing as the Commission suggests is possible.

These and the other proposed modifications of the Rural Digital Opportunity Fund explained in this document will improve the chances that our region will attract bidders. While remaining technology-neutral, the FCC will incentivize long-term solutions to the unique challenges presented in southern and eastern Ohio. If the proposed modifications elevate the reserve prices beyond what is needed, the reverse auction process will correct the overshoot. Thus the Commission will achieve both the goal of expanding broadband in truly unserved areas and being fiscally responsible.

Buckeye Hills Regional Council offers these comments on the FCC's Rural Digital Opportunity Fund Notice of Proposed Rulemaking (NPRM) based on our long experience and on our interim findings from the current ARC-funded analysis. Misty Crosby<sup>1</sup>, Executive Director of the [Buckeye Hills Regional Council](#), and Tom Reid<sup>2</sup>, President of [Reid Consulting Group](#), have been involved in the Connecting Appalachia consortium since its inception in 2009 and led the development of this document. We respectfully offer it for the Commission's consideration.

## **B. Digital Desert Persists**

We had high hopes that the 2015 CAF II funding allocated to the price cap incumbent telephone companies (telcos) serving our region<sup>3</sup> would provide a uniform minimum capability to all residents and small businesses. The nearly \$300 million distributed by the FCC across our 34-county region certainly appeared to be sufficient to achieve this goal.

Unfortunately, the incumbent telcos have largely conducted de minimis deployments leaving large areas of the "rural expanse"<sup>4</sup> unserved. The telcos have met the letter of the requirements but certainly not the spirit of the Connect America Fund. In areas with broadband service, shortfalls in capacity and reliability greatly diminish the usefulness.

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<sup>3</sup> The price cap incumbents serving our region include Frontier, Windstream, CenturyLink and AT&T.

<sup>4</sup> "Rural expanse" defined as populated areas with 20 or fewer households per square mile.

### Order of Magnitude Overstatement of Availability

The de minimis deployments coupled with the Form 477 mapping process have overstated broadband availability by an order of magnitude in the low population density areas.

As an example, Figure 2 shows a 740 acre (1.2 square miles) census block in Meigs County, Ohio, typical of our study area. Of the fourteen households in the 391059642001030 block (white dots within the pink boundary), Frontier has provided 10/1 service to a single location in the southern most corner of the block (darker pink dot).<sup>5</sup> As with many similar census blocks, the broadband maps based on Form 477 data will show the area served while the reality is quite different, in this case constituting a 13:1 overstatement of coverage. No other carriers have filed a Form 477 for this census block.

The density of CAF II deployments varies widely. Consider Figure 3 showing two census blocks in a vacation area around Seneca Lake in Noble County, Ohio. Here Frontier delivered CAF II-funded broadband connections to every eligible address (pink dots). Our analysis suggests that such “cherry-picking” of high-density areas is common.

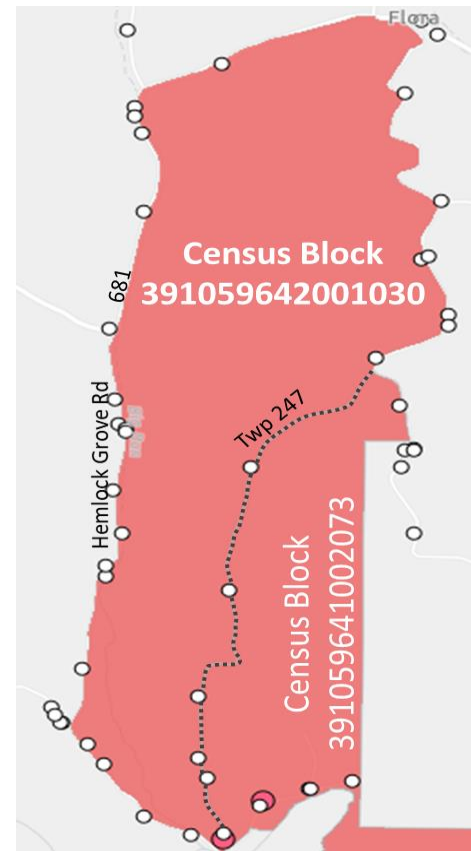


Figure 2: Example of de minimis CAF II deployment

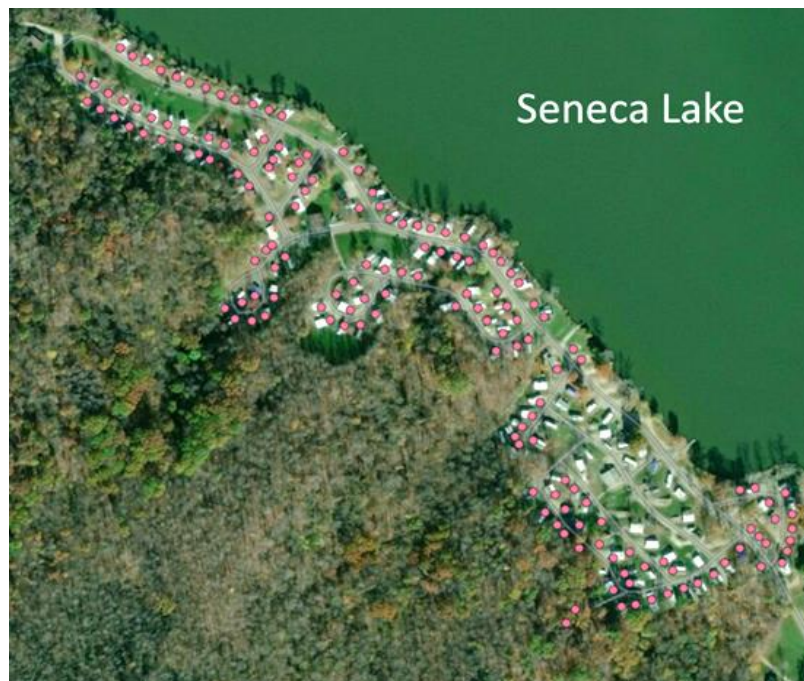


Figure 3: Example of high-density CAF II deployment

<sup>5</sup> Based on USAC HUBB data as of 3 September 2019.

Our current study area, the eight “starred” counties in Figure 1, covers 3,665 square miles and 100,000 households, an average of 27 households per square mile (one-quarter of the density compared to the State of Ohio overall). Nearly 25% of the study area and 20% of the households are in census blocks with HUBB-reported CAF II deployments. Figure 4 provides the stark reality of broadband coverage overstatement due to de minimis deployments in these CAF II-funded areas.

Census Blocks with HUBB-Reported CAF II Deployments	Square Miles	Eligible Households	CAF II Deployments	Post-CAF II Unserved Households	Broadband Availability Overstatement
Complete Area of 1,025 Census Blocks	885	19,254	4,078	<b>19,254</b>	<b>4.7 to 1</b>
			21%	<b>79%</b>	
Most Egregious Areas of 600 Census Blocks	663	14,725	1,440	<b>13,285</b>	<b>10.2 to 1</b>
			10%	<b>90%</b>	

*Figure 4: Overstatement of availability in CAF II census blocks due to de minimis deployment*

Data is lacking to complete the same analysis across the entire study area. Extrapolating, though, when the Form 477 data suggests an area of the rural expanse has, as an example, 62% broadband availability, our analysis shows that 6.1% to 13.2% broadband availability to be a much more accurate estimation. Despite the lack of broadband access, these largely unserved census blocks would be denied funding from other sources such as USDA ReConnect due to carve-outs meant to prevent over-building.

#### Impact of Rural Census Block Size

Rural realities magnify the impact of the “serve a single location in a census block and mark the block as served” flaw in current maps. Figure 5 illustrates the relative size of typical urban and town census blocks of two and six acres respectively compared to the rural census block in our example in Figure 2 of 740 acres.

The assumption that once one location in the census block is served that the same carrier can expand to serve all locations in the census block may make sense in urban areas but does not reflect reality in the rural expanse. In southern and eastern Ohio, a single census block can be as large as 3,500 acres.



*Figure 5: Comparative sizes of rural vs urban census blocks*

While the Commission has recognized this issue, we raise it here to highlight the digital desert that continues to persist despite the expenditure of hundreds of millions of dollars in USF funding meant to address last mile broadband deployments. This speaks to the urgency and magnitude of funding required in the RDOF auction to successfully target Appalachian Ohio.



### End-of-Life Copper Plant

The incumbent telcos' decades-old copper infrastructure provided crucial and reliable telephone services. Unfortunately, the copper plant has been neglected, allowed to degrade in place resulting in unreliable telephone service<sup>6</sup> and inadequate transmission characteristics for supporting broadband. Availability of broadband services, even with new fiber nodes nearby, remains severely limited due to the condition of the last mile copper cables. Of course, this is of no surprise to the Commission given proceedings to allow expedited abandonment of copper plant.<sup>7</sup> AT&T's CAF II-funded efforts to deploy fiber-fed towers for fixed wireless, while commendable, will not provide an ubiquitous copper replacement solution as detailed in Section C of this document.

### Unwillingness to Invest

Incumbent telcos have also resorted to a "no vacancies" strategy to deny service in reportedly served areas, stating to potential customers that the existing electronics has no available ports, expressing a lack of intent to add capacity, e.g. "You will have to wait for someone to move away to get a DSL port."<sup>8</sup> These realities are supported by the Pew Research finding that fully 58% of rural Americans indicate that access to high-speed broadband is a problem in their area.<sup>9</sup>

## **C. Overarching Architecture and Fiber-to-the-Premise in Connecting Appalachia Territory**

As part of the ARC-funded study, BHRC is crafting overarching broadband architectures to determine feasibility of various technical options and establish realistic financial pro forma. We are selecting representative engineering zones based on a variety of criteria including terrain, foliage cover and population density. Both fiber-to-the-premise and hybrid fixed wireless/fiber designs are being modeled.

Our first engineering zone is a 50 square mile portion of northern Meigs County, Ohio, as shown in Figure 6. This area offers an example typical of the rural expanse in Appalachian Ohio with a population density of 20 households per square mile.

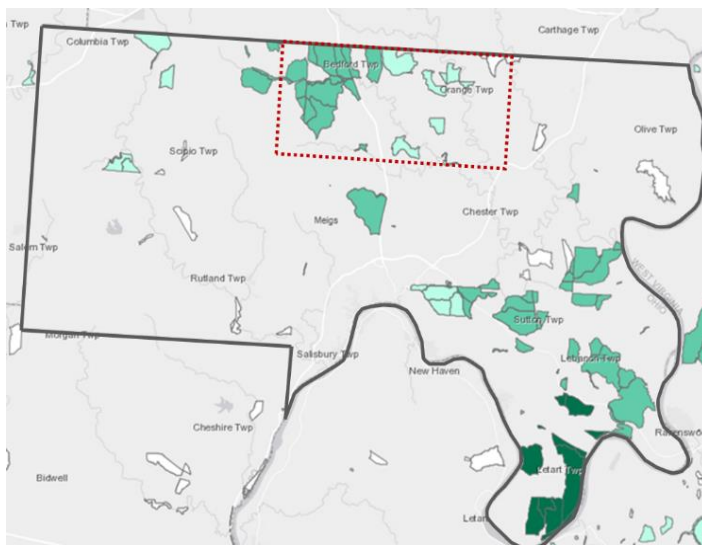


Figure 6: Meigs County, Ohio, with first engineering zone (red dotted area) and Auction 903 eligible blocks (teal shaded areas)

<sup>6</sup> Public Utilities Commission of Ohio investigation into Frontier as an example <https://www.puco.ohio.gov/media-room/media-releases/puco-initiates-complaint-against-frontiers-landline-service/>

<sup>7</sup> FCC WC Docket No. 17-84 Accelerating Wireline Broadband Deployment by Removing Barriers to Infrastructure Investment

<sup>8</sup> A conversation by a local resident with a Frontier representative.

<sup>9</sup> <https://www.pewresearch.org/fact-tank/2018/09/10/about-a-quarter-of-rural-americans-say-access-to-high-speed-internet-is-a-major-problem/>

The small set of representative engineering zones will enable us to generate strong per-square-mile estimations of costs for extending broadband across unserved or underserved portions of the region. This sampling approach works because engineering options to connect a largely rural county with a handful of population centers will vary little from county-to-county. As another example, the technical options for dealing with foliage-covered ravines will remain constant across the region.

### Fiber to the Premise Imperative

We have found that fiber-to-the-premise (FTTP) offers the only solution that can achieve 100% coverage at a performance tier above the RDOF “Baseline” of 25/3. While capital costs for FTTP will be high the operating costs will be lower than other options. The useful life of a new fiber infrastructure will be measured in decades.

### Long Ramp-Up of Revenues

Fiber-based solutions front-load costs with high capital construction commitments. The revenues, on the other hand, will build over time. The cost to provide fiber termination and related equipment for a customer seeking the lowest tier connectivity varies little from the cost of providing a gigabit connection. As the broadband services improve the economic conditions of the region, appetite for bandwidth will increase and revenues will rise. Such impacts, though, will take a generation to fully play out, double or triple the duration of the initial 10-year RDOF subsidy allocations.

### Fixed Wireless Limitations

The combination of terrain and foliage makes uniform fixed wireless coverage prohibitively expensive and low capacity. Consider the 20 square mile portion of our first engineering zone in Figure 7. Even with three optimally sited towers, each 300 feet tall, spaced only 3 to 4 miles apart, many locations remain unreachable for line-of-sight transmissions due to the terrain.

Line-of-sight, though, is not sufficient in Appalachian Ohio. Our region’s heavy foliage cover, as shown in Figure 8, eliminates high-frequency<sup>10</sup> options, curtailing coverage from any given tower, limiting speeds and diminishing overall capacity.

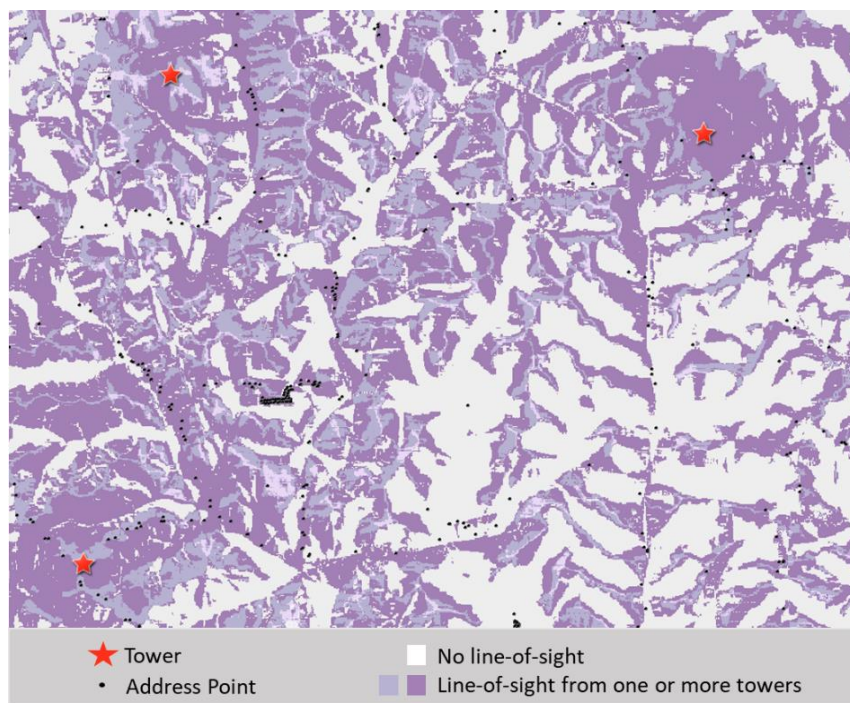


Figure 7: Wireless propagation in 20 square mile portion of engineering zone

<sup>10</sup> Radio signals above 1 GHz do not penetrate foliage cover of any significance.

Spectrum bands below 1 GHz will penetrate foliage but still face the terrain obstacles and offer overall lower capacity. TV White Space (TVWS) options remain constrained by the height and power restrictions.

Blanketing the area with fixed wireless would thus necessitate adding numerous pole-mounted access points fed by either fiber or wireless backhaul.

Further, robust annual foliage growth in Appalachia can render a working high-frequency line-of-sight path unusable in a single year, requiring nimble network re-engineering.

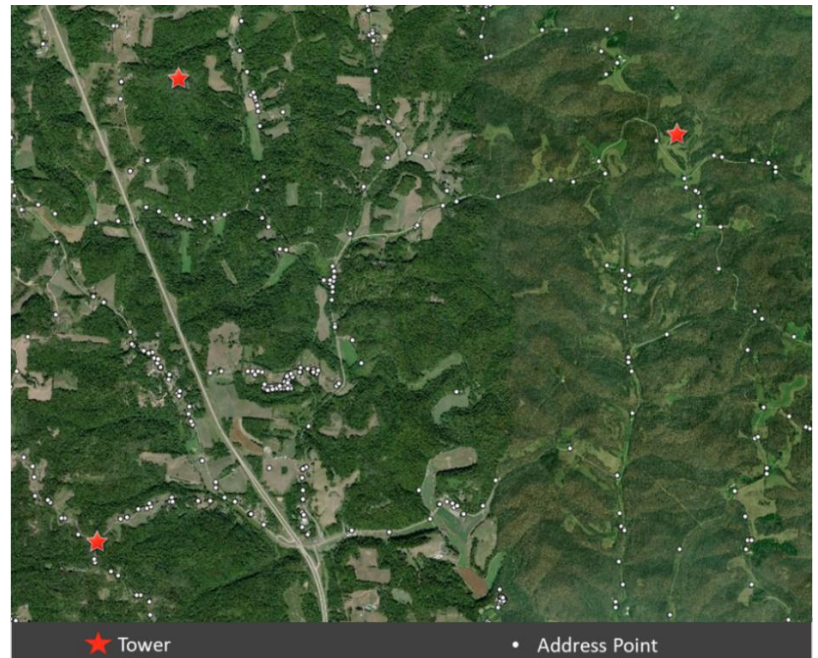
For these reasons, we do not see fixed wireless as a viable option for achieving 100% coverage in our region. AT&T can be commended for building new fiber-fed towers to deliver fixed wireless as part of the CAF II obligations, but their efforts will not result in ubiquitous coverage.

#### **D. Lack of Bidder Response to Auction 903 in Connecting Appalachia Territory**

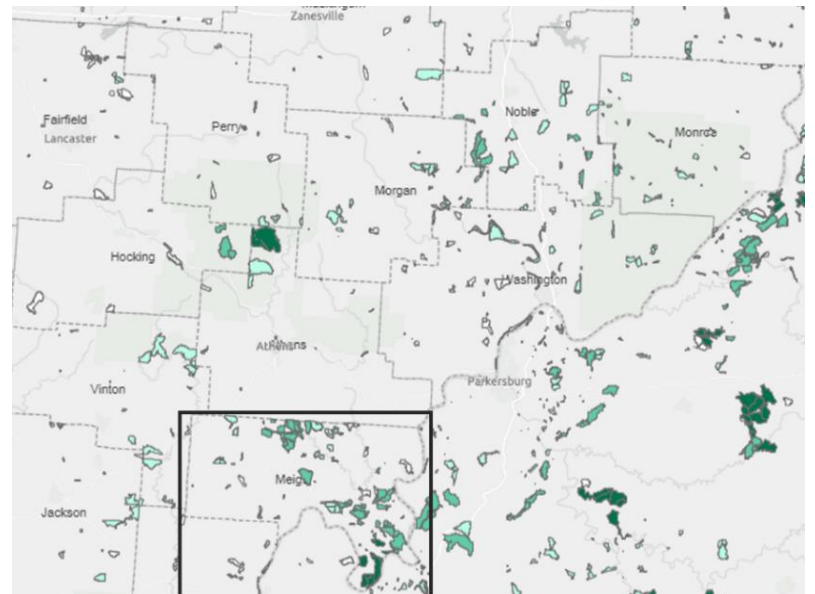
In Connect America Fund Auction 903 in 2018, numerous census blocks were offered to bidders in southern and eastern Ohio as shown in Figure 9.

While the non-contiguous distribution of the eligible blocks impacted bidding, Meigs County, Ohio offered a more concentrated collection of eligible blocks with a cumulative reserve price of \$3.3 million.

Unfortunately, no one on earth bid on any of the Auction 903 opportunities in southern and eastern Ohio. Results were similarly bleak across much of Appalachia.



*Figure 8: Foliage cover in 20 square mile portion of engineering zone, same area as in Figure 7*



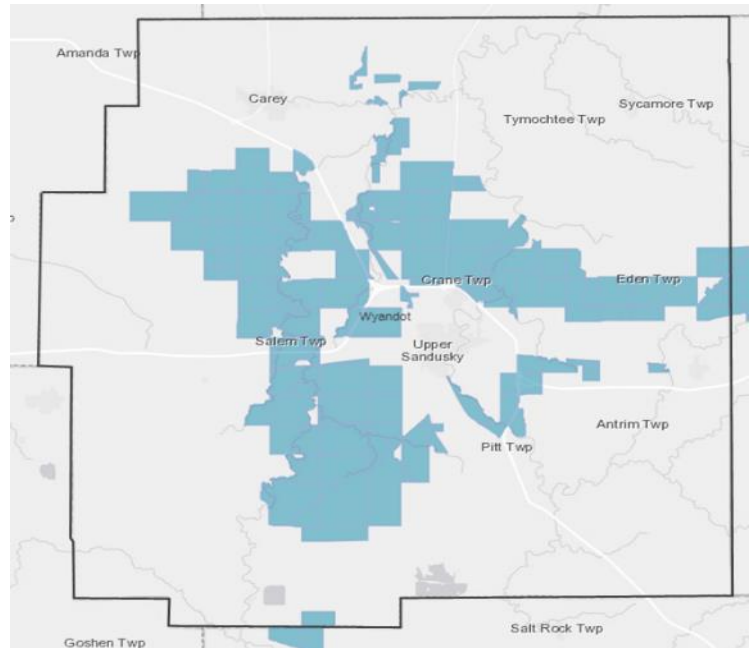
*Figure 9: Auction 903 eligible blocks in study area (teal shaded), Meigs County, Ohio, outlined in black box*



In contrast, eligible census blocks in Wyandot County, Ohio, in Figure 10, are located in the “flatlands” of northwest Ohio and offered a ten-year maximum reserve price of \$3.9 million. Given the flat and largely treeless terrain of this farming region, a rural telco<sup>11</sup> was able to win the auction with a plan to deploy fixed wireless as the primary last mile solution.

While the contiguous collection of census blocks in Wyandot County improves the deployment economics, the primary reason the area was more attractive than Meigs County in Auction 903 was due to the flat terrain and lack of foliage cover.

Consider the very different view from a tower in the “flatlands” such as Wyandot County versus a tower in Appalachia as illustrated in Figure 11.



*Figure 10: Wyandot County, Ohio, with Auction 903 eligible blocks shaded blue*



*Figure11: View from towers in the "Flatlands" vs Appalachia*

<sup>11</sup> Benton Ridge Telephone Company, also known as WATCH Communications.

## Specific Comments on the Rural Digital Opportunity Fund NPRM

### E. Performance Tiers, Latency and Weights

*In paragraph 25 of the RDOF NPRM, the Commission requests comments on the weighting of the performance and latency tiers.*

We encourage the Commission to maximize the point spread between the gigabit tier and all other speed tiers as proposed in Figure 12. We further encourage the Commission to eliminate the high latency option for the RDOF. These modifications would give the FCC significant capacity to favor long-term solutions such as fiber-to-the-premise, meeting the fiduciary responsibilities while offering transformative broadband infrastructure, serving the region’s needs for decades.

Performance Tier	Speed	Weight
Baseline	25/3 Mbps	95
Above Baseline	100/20 Mbps	30
Gigabit	1 Gbps/500 Mbps	0
Low Latency Only		

*Figure 12: Proposed RDOF auction weighting*

The funding awarded in the first round of the RDOF auction will likely be released in 2021 and provide support through 2030. Given how long our residents have suffered from lack of broadband, it is crucial that the Commission minimize investments in short-term solutions that would do little more than meet the “Baseline” requirements.

Fiber-to-the-premise solutions offer the capacity and longevity to match the FCC’s objectives and offers infrastructure that would transform Appalachia. Given our rugged terrain and heavy foliage, our analysis finds FTTP to be the only option for achieving 100% coverage at speeds faster than baseline. While we can all agree that fiber-to-the-premise offers the best solution in Appalachia, the economics of the investment remain daunting. For these reasons, increasing the weighting point spread between the gigabit tier and lower speed tiers will make investment in fiber solutions financially feasible.

Eliminating high latency services will avoid investment in satellite-based options that do not offer a long-term solution for the needs of the region. Relegating Appalachia to satellite services will extend the digital divide rather than helping to close it. A ten-year allocation of RDOF funding for satellite services would exclude these areas from competing for other broadband funding due to the prevalence of carve-out provisions meant to avoid over-building.

New swarms of low orbit satellites may offer better services in the future but many technical challenges remain. In Appalachia, the rugged terrain and heavy foliage make utilization of today’s satellite services problematic and will present similar challenges to new satellite technologies.

## F. Reaching 100% versus 95% of Households

*In paragraph 29 of the RDOF NPRM, the Commission requests comments on the service obligations.*

We suggest that the FCC require 100% coverage with no subsequent ability for winning bidders to be excused from serving the highest-cost 5% of locations. Given the opportunity to serve only 95% of households, a rational bidder will design their networks to exclude the hardest to reach locations, providing an obvious advantage compared to bidders that design to the 100% objective.

In our engineering zone depicted in Figure 6, we designed a fiber-to-the-premise solution to reach every address, following road centerlines. Consider a small section of census block 391059642001026 in Meigs County, Ohio in Figure 13. A single dwelling near the northeast border of the block requires a 4,100 foot extension of the fiber with no other potential customers along the path (circled in dotted red line). Reaching this single service location would add \$19,400 to \$38,800<sup>12</sup> to the project. Figure 16 pictures the road in this example. Note these locations do have commercial electrical service.

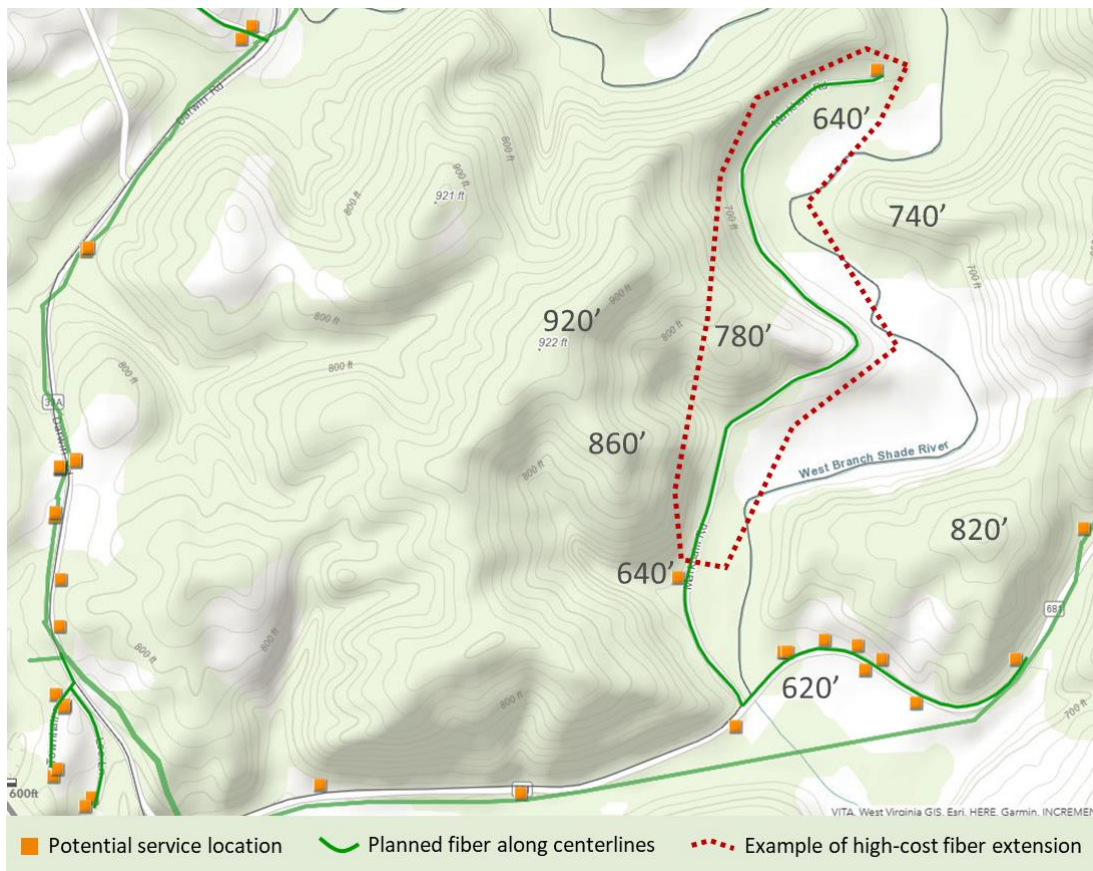
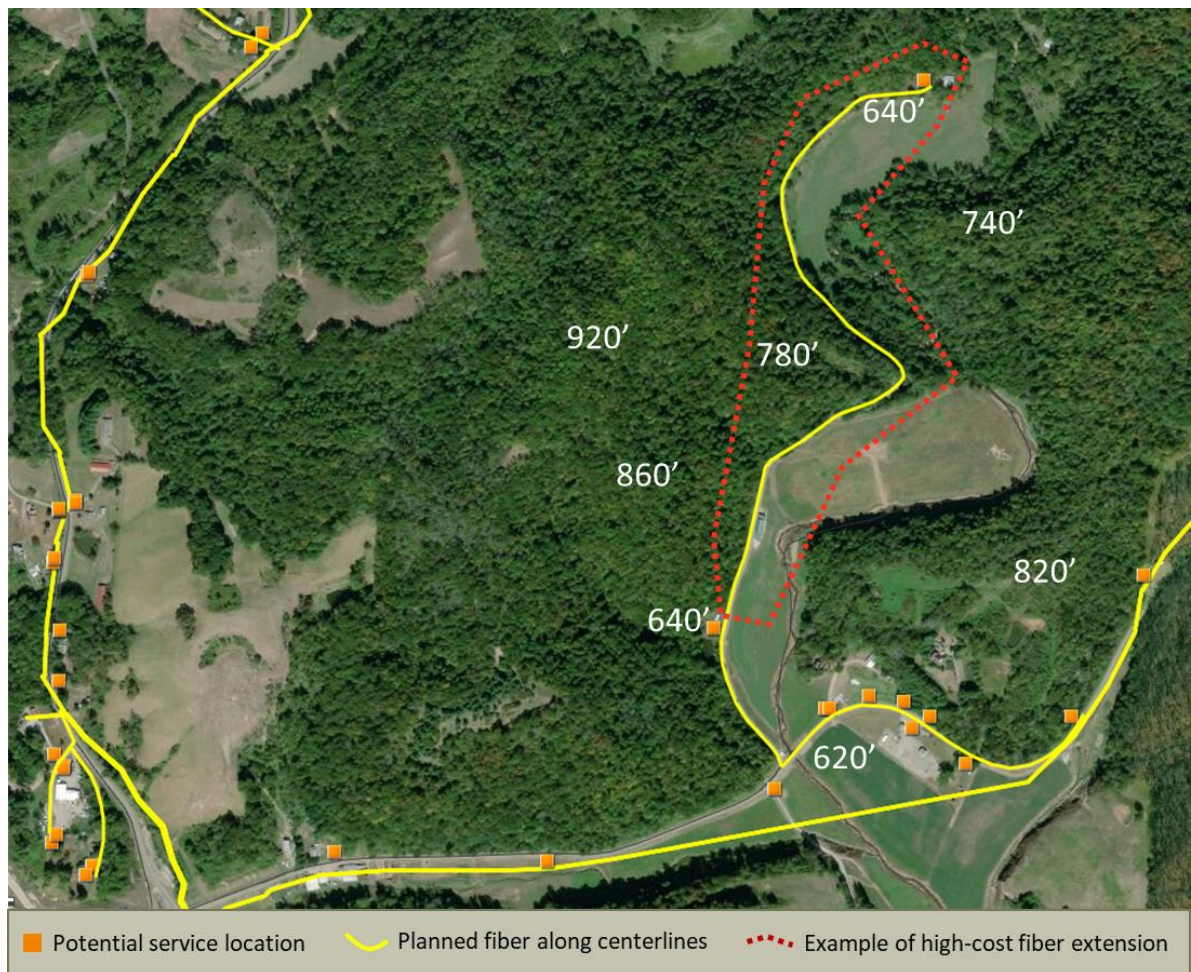


Figure 13: Example of a typical high-cost location on Markham Rd in Meigs County, Ohio

<sup>12</sup> Based on a cost range of \$4.73 to \$9.47 per foot with the variation related to the magnitude of pole make-ready costs. Even if average cost per foot for fiber can be significantly reduced, the reality of this type of high-cost location de-selection would persist.



The terrain between the more closely spaced service locations and the high-cost service location would obviate affordable wireless options for extending service. The heavy foliage shown in Figure 14 exacerbates the impracticability of extending a wireless service from the neighboring fiber, eliminating high frequency options and reducing viability of line-of-sight transmission. Thus extending fiber to this distant location remains the most cost-effective solution.



*Figure 14: Example of a typical high-cost location with foliage on Markham Rd in Meigs County, Ohio*

Fixed wireless operators would be similarly likely to eliminate such households. Consider the surrounding terrain for this location, with the house located at low elevation, nestled against a steep hill to the north with multiple terrain factors in all directions creating propagation shadows. Add in the heavy foliage and the targeted location becomes a daunting puzzle for a fixed wireless provider to reach.

In both figures 13 and 14, the orange squares indicate potential residential and business service locations based on State of Ohio Location Based Response System data.<sup>13</sup>

<sup>13</sup> <https://ogrip.oit.ohio.gov/ProjectsInitiatives/LBRS.aspx>



This census block is reportedly served by Frontier Communications at speeds of 24/3. However, as discussed in Section B of this document, broadband availability has been vastly overstated, particularly in the rural expanse. Further, upon the completion of the legacy support transition period, one may reasonably expect Frontier or any other incumbent telco who does not receive RDOF proceeds to seek to abandon the copper cables and related carrier of last resort obligations.

### G. Extending Fiber from the Street to the Premise

*In paragraph 40 of the RDOF NPRM, the Commission requests comments on performance targets as related to extending services from the street to the premise.*

Given that precise service locations remain to be discovered in more advanced mapping initiatives, we propose that bidders with fiber-to-the-premise projects be granted a standard allowance of 100 feet of drop cable from the street to the premise, a distance that will address a large majority of the service locations. Beyond the proposed allowance of 100 feet, the property owner would bear the additional costs. Such a provision will better align bidding on fiber solutions.

In addition, the 10-day service obligation will always be tight for extension of fiber drop cables from the street to the premise. In some cases, the 10-day service delivery allowance will be far from adequate.

Consider, as an example, a remote household located in our engineering zone in Figure 15. The yellow points show the geocoded address from State of Ohio LBRS data<sup>14</sup> and the red points show the actual service locations. The example labeled “A-address” and “A-actual” provide an excellent case in point, with the service location, “A-actual,” being hundreds of feet away from the “A-address” location on the road.

Extending fiber from “A-address” to “A-actual” will involve traversing a shared driveway or crossing land potentially owned by a third party if routed on the shortest path from the road. In any case, negotiation of costs and easements plus the actual time for construction will not be trivial, easily surpassing the FCC-proposed 10-day deployment target.



Figure 15: Example of long reach from address to service location

<sup>14</sup> <https://ogrip.oit.ohio.gov/ProjectsInitiatives/LBRS.aspx>

We suggest that the FCC instead require that winning bidders respond within 10 days to the potential subscriber with the cost to extend the service (if beyond 100 feet) and the easement paperwork needed to allow for construction (if applicable). To improve service delivery timelines, winning bidders could also be required to seek pre-subscription so that engineering and construction of drops can occur concurrently with construction of the fiber middle mile and laterals.

#### **H. Subscription Milestones**

*In paragraphs 41, 42 and 43 of the RDOF NPRM, the Commission requests comments on subscribership milestones.*

The 70% subscribership assumption is overly aggressive in Appalachian Ohio due to a combination of low household income and competition from existing, albeit less capable, broadband solutions. Reducing the subscribership benchmark will result in much-needed higher reserve pricing,<sup>15</sup> encouraging bidders to participate in the RDOF auction in our challenged region.

For economically distressed areas such as ours, we suggest a benchmark of 16% in year 3, increasing by 8% per year through year 6 to a maximum adoption benchmark of 40%. Adoption benchmarks higher than this will discourage bidders from participating. The risk of losing funding, through no fault of the bidder, may tilt a business analysis into a “no-go” decision.

#### Impact of Low-Capacity Competition on Subscriptions

For many rural residents, the “Netflix adequacy threshold” is the measure of broadband requirements. For these households, a 10/1 connection may suffice for a period of time, particularly considering the strain on limited household budgets to absorb the additional cost for higher speed connections. Further, as legacy networks lose customers their over-subscribed networks will perform better, further reducing adoption of higher-capacity connectivity.

Fixed wireless providers have had limited success by targeting households with a clear line-of-sight to their access point. These households may elect to retain the fixed wireless service if less expensive than a higher-capacity solution.

In other households, a mobile 4G/LTE subscription may suffice for low-intensity needs if they are fortunate enough to have coverage. While not a good answer for streaming due to the bandwidth caps, mobile LTE does provide adequate capacity for some users.

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<sup>15</sup> As evidenced by the no-bid results of Auction 903 in our region.

#### Impact of Low Household Income on Subscriptions

Across all of Appalachian Ohio, rates of household poverty exceed 17% on average and includes the eleven poorest counties in Ohio with poverty rates as high as 30%.<sup>16</sup> The combination of poverty and “near poverty”<sup>17</sup> households doubles the number of financially struggling households to an average of 34% and a high of 60% across our 34-counties. In our eight-county study area, household median income only reaches \$43,231,<sup>18</sup> lagging the state and the nation. Just 79% of households in our study area even report owning a computer.<sup>19</sup>

The Pew Research Center details the direct relationship between household income and technology utilization including home broadband subscription and computer ownership<sup>20 21</sup> in Figure 16.

Household Income	Less than \$30,000	\$75,000+
Internet Use	82%	98%
Home Broadband Subscription	56%	92%
Smartphone-Dependent Internet	26%	5%

*Figure 16: Impact of household income on technology use*

In addition to the lower overall use of the Internet and home broadband, note that 26% of low-income households rely on their smartphones for Internet access, supporting our point earlier in this section about how the reliance on 4G/LTE will suppress home broadband subscriptions. For these reasons, the 70% subscription assumption would adversely affect bidder interest in Appalachian Ohio while a 40% subscription assumption would better reflect the likely reality in the ten-year RDOF funding period.

#### **I. Census Blocks Included in Round 1**

*In paragraphs 48 and 49 of the RDOF NPRM, the Commission requests comments on methods for selecting census blocks to be included in Phase 1.*

We strongly support the Commission’s intent to couple USAC HUBB data with the Form 477 data to determine eligibility for Phase I of the RDOF auction. In our study area, 10/1 deployments represent a very large majority of the deployments reported in HUBB, regardless of the advertised speeds. In addition, as described in Section B of this document, many census blocks have only de minimis CAF II deployments, further marginalizing the relevance of the Form 477 data. The HUBB data will provide a much more granular picture of deployment realities and patterns.

<sup>16</sup> The Ohio Poverty Report, Ohio Development Services Agency, February 2019.

<sup>17</sup> “Near poverty” defined as less than 200% of the poverty rate in household income.

<sup>18</sup> <https://www.census.gov/quickfacts/fact/table/washingtoncountyohio,morgancountyohio,hockingcountyohio,athenscountyohio,perrycountyohio,meigscountyohio/PST045218>

<sup>19</sup> <https://www.census.gov/quickfacts/fact/table/washingtoncountyohio,morgancountyohio,hockingcountyohio,athenscountyohio,perrycountyohio,meigscountyohio/PST045218>

<sup>20</sup> <https://www.pewinternet.org/fact-sheet/internet-broadband/>

<sup>21</sup> <https://www.pewresearch.org/fact-tank/2019/05/07/digital-divide-persists-even-as-lower-income-americans-make-gains-in-tech-adoption/>

We also request that the Commission create a reverse challenge process in order that community organizations and citizens may contest upgraded coverage and speed claims made by carriers. Whether in the next round of Form 477 submissions or in the challenge process for RDOF Phase I-eligible census blocks, we are concerned that some carriers may inflate coverage and speed data in order to deter competitors from entering their service area.

#### **J. Establishing Reserve Prices**

*In paragraphs 56 and 59 of the RDOF NPRM, the Commission requests comments on methods for establishing reserve prices.*

As the Commission recognizes for Tribal areas, the Appalachian Ohio region will generate lower than projected end-user revenues due to fragmentation of the market for voice and video services, low household income and the impact of telephone-only subscribers. The lack of response from carriers to Auction 903 in our region as described in Section D of this document supports the need for higher reserve prices.

##### Revised High-Cost Threshold

We propose a revised high-cost threshold for the Connecting Appalachia region of \$20.00 based on a combination of:

- Lowering the penetration assumption to 40% from the current 70% as discussed in Section H of this document, and
- Lowering the projected monthly average revenue per user (ARPU) to \$50.00 from the current \$75.00, discussed below in this section.

##### Impact of Fragmentation of the Voice and Video Market on ARPU

We suggest that the FCC Broadband Assessment Model completed by CostQuest in 2010 overstates the likely ARPU because of its assumption that a significant portion of subscribers would seek telephone and/or video services from their broadband provider. The market since 2010, though, has fragmented significantly with many options for VoIP and streaming services, some at no cost to the consumer, delivered over their Internet-only broadband connection.

##### Impact of Internet-Only Subscribers on ARPU

In many households, we expect Internet-only purchases with subscribers using mobile phones or their selection of VoIP vendors for voice and relying on third party streaming services for video content. This will significantly suppress the average ARPU. Common Internet-only packages offered in towns in our study area provide 100 Mbps for under \$50. As an example, in the city of Athens, Ohio, Spectrum offers 100 Mbps Internet-only service for \$44.99 per month. With RDOF winners required to offer broadband packages similar in price to urban areas, we project that most subscribers will opt for options near the \$50 per month level.





*Figure 16: Markham Road, a gravel township road in Meigs County, Ohio,  
the same area as shown in Figures 13 and 14*

#### Impact of Low Household Income on ARPU

Here too low household income comes into play. Many of the residents of the region live in substandard housing. As an example, Figure 16 shows the first possible service location along the road illustrated in Figures 13 and 14. We would expect this prospective subscriber to opt for the lowest cost option if they can afford to subscribe at all. Yet to meet any reasonable deployment timeline, a winning bidder would need to extend fiber down this gravel road in anticipation of subscription.

As evidence, consider that nearly all HUBB-reported deployments in our region have been at 10/1, regardless of the advertised speeds. While interest in broadband is high, we anticipate subscription to the lowest adequate speeds by the majority of households due to low household income.

#### Impact of Telephone-Only Subscribers on ARPU

Higher ARPU customers will be offset by telephone-only subscribers, primarily the elderly who have not yet moved into the Internet age. While the elderly have been the fastest growing segment of Internet users in recent years, any provider in our region will continue to face a significant number of telephone-only subscribers for whom the ARPU will be well below the proposed \$50.00, yet the winning bidder will face 100% of the costs of delivering fiber-to-the-home for these telephone-only subscribers.

#### **L. Prioritizing Support**

*In paragraph 60 of the RDOF NPRM, the Commission requests comments on methods for prioritizing support to certain eligible areas where broadband is significantly lacking.*

We urgently need the FCC to prioritize funding for Appalachian Ohio for the following reasons, reiterating the introduction.

- The digital desert persists as explained in Section B of this document:
  - De minimis deployments by price cap carriers receiving CAF II in our study area have left large swaths of our region unserved; and
  - The incumbent's copper infrastructure has been allowed to degrade in place.
- Fixed-wireless options do not offer a solution for 100% coverage due to the combination of terrain and foliage cover as explained in Section C of this document.
- Fiber-to-the-premise will provide the optimal solution but requires high capital subsidies and will involve long ramp-up of revenues as explained in Section C of this document.
- The lack of response from carriers to Auction 903 in our region as described in Section D of this document demonstrates the need to increase reserve pricing.

For these reasons we ask the FCC to prioritize the pressing needs of Appalachian Ohio through the following adjustments to the Rural Digital Opportunity Fund reiterating the introduction.

1. Strongly favor the gigabit tier in the weighting and eliminate high latency services as explained in Section E of this document.
2. Lower the subscription milestone to 40%, recognizing the impact of low household income and competition from less-capable services as explained in Section H of this document.
3. Lower the projected monthly average revenue per user to \$50.00, recognizing the impact of low household income and fragmentation of the market for voice and streaming services as explained in Section J of this document.

We also encourage a 10% increase in reserve pricing as the Commission suggests is possible.

These and other proposed modifications of the RDOF explained in this document will improve the chances that our region will attract bidders. While remaining technology-neutral, the FCC will incentivize long-term solutions to the unique challenges presented in southern and eastern Ohio. If the proposed modifications elevate the reserve prices beyond what is needed, the reverse auction process will correct the overshoot. Through these measures, the Commission will achieve both the goal of expanding broadband in truly unserved areas and being fiscally responsible.

If the Commission wants to instead test such incentives, we offer our 3,665 square mile, eight-county study area for a trial program.